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EFFECT OF FINAL WEIGHT IN SWEDISH LANDRACE BOARS IN PERFORMANCE TEST ON THE FAT THICKNESS AND DEPTH OF MUSCULUS LONGISSIMUS DORSI

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***Summary*:** *Testing was performed on the effect of a final body weight in performance test on the thickness of the sidefat, backfat thickness and depth of musculuslongissimusdorsi (MLD) of Swedish Landrace boars. The study included 228 boars. Features included in the study were: fat thickness (S1), fat thickness (S2) and the depth of the of musculuslongissimusdorsi (MLD). Backfat thickness was 13,66mm, thickness of sidefat 13,2mm and average depth of MLD is 62,6mm. There was a statistically significant effect on final body weight on investigated traits. There was also a significant correlation between the final body weight in the performance test on backfat thickness 0.35 (P <0.05); the thickness of the sidefat 00.25 (P <0.05) and the depth of the MLD 0.19 (P <0.05). In order to obtain a clearer picture of the impact of the final mass in the performance test, groups were formed: I (over 109kg); II (103-109kg); III (97 to 102.9 kg) and IV (less than 96.9 kg). First group established the maximum thickness of the backfat (15,95mm), a sidefat (14,92mm) and the depth of MLD was (68,57mm), while in group IV had minimum thickness of backfat (11,81mm), the thickness of the sidefat (11,14mm) and the depth of MLD (56,14mm). The difference in the average values of the examined traits between different weight groups was statistically significant (P <0.05). The results clearly show that the increase of the mass in performance test in Landrace boars, have positive corelation with the thickness of back and sidefat, with a small increase in the depth of MLD. These results clearly show that the increase of the final mass changes the meat-fat ratio in favor of fat, which affect the final assessment on breeding values of boars. Also, the results indicate that boars with a higher final weight at the end of the test, have lower values breeding values.*

Key words: *Swedish Landrace, performance test, meat quality*

INTRODUCTION

The essence of the genetic improvement of animals through breeding programs is to choose animals that have the highest genetic value and which will be the parents of the next generation. The selection index is one of the methods that can be used to estimate genotype of animals and its breeding value.Selection indexes provide an overall "score" of an animal's genetic value for a specific purpose and are calculated based on weightings placed on individual traits that are deemed to be important for that purpose.In order to see the progress of properties involved

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in the performance test in boars of the Swedish, an analysis of data from a performance test is done. The analysis included an amount of 228 boars of the Swedish Landrace from six farms in Vojvodina in the period from 2010. to 2015. In the tests we have included the impact the genotype have on the value of the characteristics in a performance test.

MATERIAL AND METHODS

Data base of main breeding organization in Novi Sad (conducting the main breeding program) is used for the study. We used performance test data of Swedish Landrace boars breed in the period of 2010 - 2015 year. Testing was performed on the effect of a final body weight in performance test on the thickness of fat and depth of large back muscle of Swedish Landrace boars. Following characteristics were tested: fat thickness (backfat) S1, fat thickness (sidefat) S2, the depth of the musculuslongissimusdorsi(MLD), and the impact of the final weight in the performance test on the studied characteristics. A total of 228 boars with completed performance test were observed. Boars were divided in to weight groups: I (over 109kg); II (103-109kg); III (97 to 102.9kg) and IV (less than 96.9kg). Gained results underwent analysis of variance concerning backfat thickness, sidefat thickness and depth of MLD at final mass of animal. *Least significant difference* (LSD) test determined differences between weight groups.

RESULTS

Table 1.presents description of standard statistic features included in the study: fat thickness (S1) , fat thickness (S2) and the depth of the of musculuslongissimusdorsi (MLD). Backfat thickness was 13,66mm, thickness of sidefat 13,2mm and average depth of MLD is 62,6mm.

Table 1. Description of standard statistic features included in the study

	Number of boars	Mean	Variance	Std.Dev.
S1	228	13.6579	14.4111	3.79619
S2	228	13.2105	15.4004	3.92434
MLD	228	62.5614	167.8420	12.95539
Kg	228	102.8596	34.0243	5.83303

Analysis of variance at the end of the test show statistically significant effect of the final mass on thickness of the backfat, sidefat and depth of MLD (Table 2).

Table 2. Analysis of variance

	SS-Effect	df-Effect	MS-Effect	SS - Error	df-Error	MS-Error	F	p
S1	615.39	20	30.77	2655.93	207	12.83	2.3981	0.0011*
S2	534.92	20	26.75	2960.97	207	14.30	1.8698	0.0161*
MLD	6401.85	20	320.09	31698.29	207	153.13	2.0903	0.0055*

* Marked effects are significant at p < .05000

Figure 1.shows frequency distribution related to fat thickness (S1), with the highest value frequency distribution generated in the first group (15.95), and lowest in the fourth group (11,81).

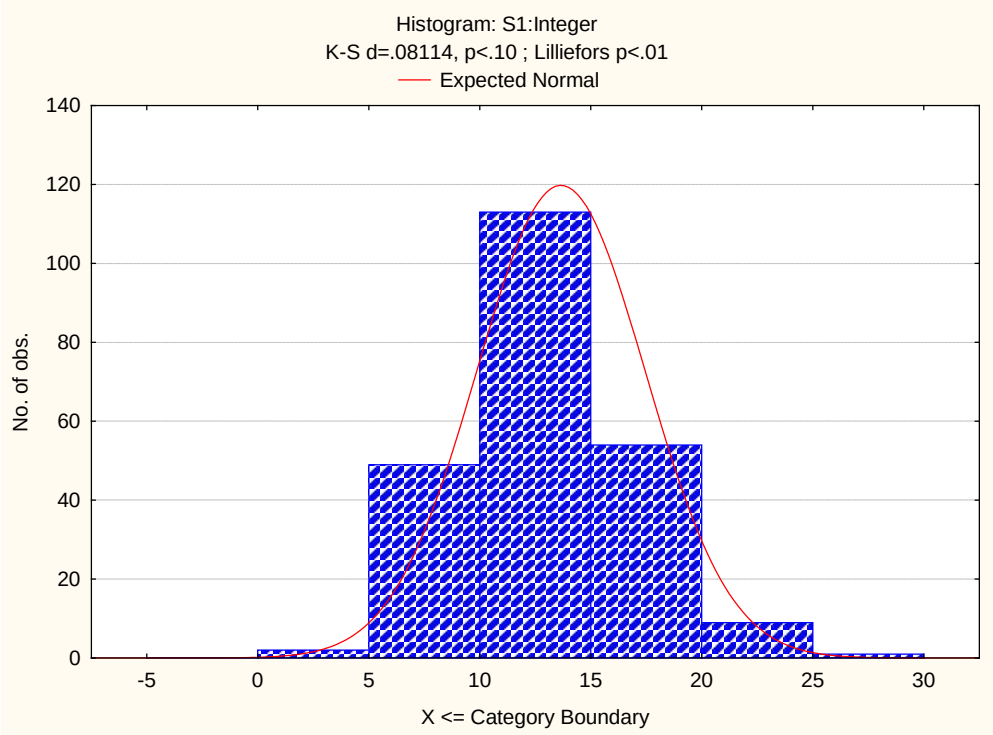

Figure 1: Frequency distribution of characteristics of backfat thickness

In Figure 2 we can see that the value distribution related to the thickness of a side of bacon (S2) had the highest values in the first group (14.93), and lowest in the fourth group (11,14).

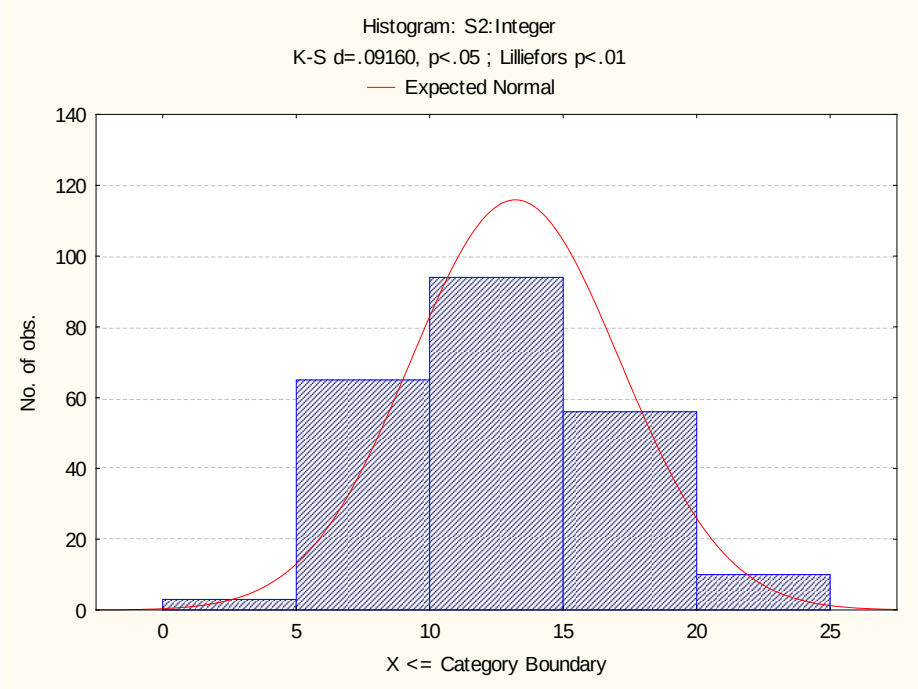

Figure 2: Frequency distribution of characteristics of side fat thickness

Figure 3. shows frequency distribution of MLD depth, with values limit of 68.57 in the first to 56.14 in the fourth group.

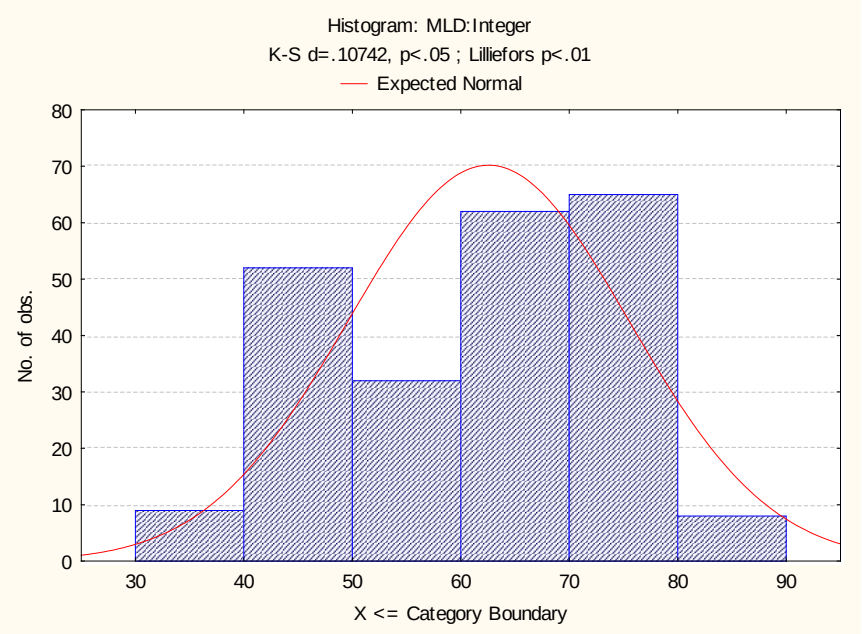

Figure 3: Frequency distribution of characteristics on MLD depth

Table 3. presents the data regarding the descriptive statistics at the level of weight between tested groups. It shows that the value of fat thickness was greatest in the first weight class (15.95 mm) and gradually decreasing, while the lowest value recorded is in the fourth group (11.81 mm). When it comes to the side of bacon thickness values have also decreased from the first weight groups (14.93 mm) to fourth and had its lowest value (13.21mm). The values of the depth of MLD were greatest in the first group (68.57 mm), and lowest in the fourth (56.14 mm).

Table 3. Descriptive statistics at the level of weight between tested groups.

Group / weight	S1- Means	S1:- N	S1:- Std.Dev.	S2: - Means	S2: - N	S2: - Std.Dev.	MLD: - Means	MLD: - N	MLD: - Std.Dev.
I	15.95	42	4.70	14.93	42	4.81	68.57	42	10.21
II	14.06	88	3.41	13.30	88	3.57	60.95	88	13.79
III	12.62	61	3.01	13.16	61	3.74	64.64	61	12.61
IV	11.81	37	3.27	11.14	37	2.95	56.14	37	10.82
All Grups	13.66	228	3.80	13.21	228	3.92	62.56	228	12.96

Analysis of variance show statistically significant impact of weight groups on the thickness of the back and sidefat thickness and depth of MLD (Table 4).

Table 4. Analysis of variance

	SS - Effect	df - Effect	MS – Effect	SS - Error	df -Error	MS - Error	F	p
S1	426.69	3	142.23	2844.62	224	12.70	11.2000	0.0000*
S2	284.11	3	94.70	3211.79	224	14.34	6.6048	0.0003*
MLD	3535.65	3	1178.55	34564.49	224	154.31	7.6378	0.0001*

*Marked effects are significant at p < .05000

LSD test shows statistically significant differences between weight group in observed characteristics (Table 5, 6, 7). Table 5. , shows significant difference between the mean values of S1 in all weight groups, except between weight groups III and IV .

Table 5. LSD test between weight groups for trait S1

LSD Test, Variable: S1				
	{1} - M=15.952	{2} - M=12.623	{3} - M=14.057	{4} - M=11.811
I {1}		0.000005*	0.004983*	0.000001*
II {2}	0.004983*	0.016534*		0.001489*
III {3}	0.000005*		0.016534	0.275265
IV {4}	0.000001*	0.275265	0.001489*	

Marked differences are significant at p < .05000

Table 6 shows significance difference of the average value S2 for all weight groups, except for the II and III group weight , while the significance difference of average depth of MLD, is present amongst all groups, except the between weight groups I and II.

Table 6. LSD test between weight groups for trait S2

LSD Test; Variable: S2 Marked differences are significant at p < .05000				
	{1}- M=14.929	{2} - M=13.164	{3} - M=13.295	{4} - M=11.135
I {1}		0.02101*	0.022389*	0.000014*
II {2}	0.022389*	0.835047		0.003957*
III (3}	0.02101*		0.835047	0.010781*
IV{4}	0.000014*	0.010781*	0.003957*	

Marked differences are significant at p < .05000

Table 7. LSD test izmeđutežinskihgrupazaosobinu MLD

LSD Test; Variable: MLD Marked differences are significant at p < .05000				
	{1} - M=68.571	{2} - M=64.639	{3} - M=60.955	{4} - M=56.135
I {1}		0.115813	0.001247*	0.000014*
II {2}	0.001247*	0.076354		0.048915*
III {3}	0.115813		0.076354	0.001182*
IV {4}	0.000014*	0.001182*	0.048915*	

*Marked differences are significant at p < .05000

The results of our examination of the correlation between the final mass and investigated characteristics (Table 8) show that there is a positive correlation between the final mass of the S1 (0.35; P<00,5), the final mass and S2 (0.25; P<00,5) and the final mass and the MLD (0,19; P<00,5).

The results show that with the increase of the final mass evidently comes to an increase in S1 and S2, which later directly affect the assessment of breeding values of boars, which can result in a disconnection from breeding.

Table 8. Correlation between the studied traits and final mass at the end of the test.

Variable	Final weight
s1	0,35*
s2	0,25*
MLD	0,19*

*Marked correlations are significant at p < .05000

DISCUSSION

This research show significant effect of the final mass on thickness of the backfat, sidefat and depth of MLD. Similar conclusion was presented by Senčić et al. (2005) in researches of crossbreeds of Great Yorkshire, Swedish Landrace and Pietren fattened to 90.30 kg, 100.40 kg., 110.30 kg., 120.50 kg and 130.20 kg body mass. It is determined that as final body mass of fattened pigs was increasing, a relative share of ham meat in carcasses was decreasing to a statistically significant extent, as well as a relative share of back and shoulder meat, but not

statistically significant (P>0.05). Senčić et al. (2008) indicate that there are significant differences in conformation of carcasses of pigs in terms of their body mass prior to slaughter. Pigs with larger body mass produced carcasses with a higher relative share of yawl and abdominal-rib part, while pigs with lower body mass produced carcasses with a significantly higher share (P 0.05) were determined between the analyzed groups of pigs, although heavier pigs produced carcasses with a somewhat lower relative share of hams. Results of our study that shows frequency distribution related to fat thickness are consenting to Škorput et al.(2009.) that found prolongation of test for 10 days and body mass increased backfat for approximately 1mm. Both, side and backfat thickness are higher at larger animals. Findings ofWähner et al. (2001.) confirms these observation. Weight of animals in test did not have large direct efect on MLD depth, with values limit of similar in all groups. Kuzelov et al. (2011.) found that no significant differences (P>0.05) were determined in terms of meat contents in carcasses, depending on prior toslaughter live weight of the large white breed . This results are consenting with Ellis et al. (2001), Miller et al., (2000), Therkildsen et al. (2001)Chiba et al. (2002),James et al. (2002) andNisen et al. (2006)claiming that quality of pig meat and carcass is influenced, in addition to genetic and para genetic, by final body mass of fattened pigs(Ellis and Betol, 2001; Senčić et al., 2005).

CONCLUSION

The results clearly show that the increase in final mass of Swedish Landrace boars in performance test, increases the thickness of backfat thickness and side of bacon, with a small increase in the depth of MLD. These results also show that the increase of the final mass changes the meat-fat ratio in favor of fat, which affect the final assessment of boars breeding values. Results indicate that boars with a higher final weight at the end of the test, have lower assessment of breeding values.

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EFEKAT ZAVRŠNE TEŽINE NERASTOVA ŠVEDSKOG LANDRASA U PERFORMANS TESTU NA DEBLJINU SLANINE I DUBINU MUSCULUS LONGISSIMUS DORSI

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Izvod: Ispitivan je uticaj završne mase u performans testu na debljinu bočne, debljinu leđne slanina I dubinu velikog leđnog mišića (musculuslongissimusdorsi-MLD).Ispitivanje je obavljeno na nerastovima rase švedski landras. U isitivanje je uključeno 228 nerastova. Osobine koje su uključene u ispitivanju jesu: Debljina slanine S_1 (S_1), debljina slanine S_2 (S_2) i dubina velikog leđnog mišića (MLD). Prosečna debljina slanine je 13,66mm, debljina bočne slanine 13,2mm i prosečna dubina MLD-a je 62,6mm. Ustanovljen je statistički značajan uticaj završne telesne mase na isitivane osobine. Takođe je utvrđena statistički značajna korelacija završne telesne mase u performanst testu na debljunu leđne slanine 0,35 ($P<0.05$); debljinu bočne slanine 0,25 ($P<0.05$) i dubinu MLD-a 0,19 ($P<0.05$). Kako bi se jasnije dobila slika o uticaju završne mase u performans testu formirane su grupe: I (preko 109kg); II (103-109kg); III (97-102,9kg) i IV (manje od 96,9kg). Kod prve grupe ustanovljena je najveća debljina leđne slanine (15,95mm), bočne slanine (14,92mm) i dubina MLD-a (68,57mm), dok je kod IV grupe ustanovljena najmanja debljina leđne slanine (11,81mm), debljina bočne slanine (11,41mm) i dubina MLD-a (56,14mm). Razlika u prosečnim vrednostima ispitivanih osobina između težinskih grupa je statistički značajna ($P<0.05$). Dobijeni rezultati jasno pokazuju da se sa povećanjem završne mase u prerformanst testu kod nerastova rase landras ovećava debljina leđne slanine i debljina bočne slanine, sa malim povećanje dubine MLD-a. Ovi rezultati jasno pokazuju da se sa poećanjem završne mase menja odnos meso-mast u korist masti što utiče na krajnju procenu oplemenjivačke vrednosti nerasta. Takođe dobijeni rezultati pokazuju da nerastovi sa većom završnom masom na krjau testa ostvaruju niže vrednosti procene oplemenjivačke vrednosti.

Ključne reči: švedski landras, performans test, kvalitet mesa

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